

STUDENTS ENTERING AP CALCULUS AB

The following pages include basic concepts from Algebra I and 2 that are necessary in order to be successful in AP Calculus AB. In addition, you must know basic trigonometry (unit circle and 3 basic trig identities). Without strong Algebra skills, calculus will be almost impossible. If it is determined within the first few weeks of school that you do not have the basic algebra skills necessary for this course, it is possible that you will be removed. This will not be collected or graded. The purpose is for you to make sure you have the skills needed. You have all summer to become proficient in any lacking skills.

During the first week of school I will make solutions to these pages available on my website: Holmesmath.weebly.com

If there are any questions or concerns, I can be reached at FranHolmes@browardschools.com.

Equation of a line

Slope intercept form: $y = mx + b$

Vertical line: $x = c$ (slope is undefined)

Point-slope form: $y - y_1 = m(x - x_1)$

Horizontal line: $y = c$ (slope is 0)

1. Use slope-intercept form to find the equation of the line having a slope of 3 and a y-intercept of 5.
2. Determine the equation of a line passing through the point (5, -3) with an undefined slope.
3. Determine the equation of a line passing through the point (-4, 2) with a slope of 0.
4. Use point-slope form to find the equation of the line passing through the point (0, 5) with a slope of $2/3$.
5. Find the equation of a line passing through the point (2, 8) and parallel to the line $y = \frac{5}{6}x - 1$.
6. Find the equation of a line perpendicular to the y-axis passing through the point (4, 7).
7. Find the equation of a line passing through the points (-3, 6) and (1, 2).
8. Find the equation of a line with an x-intercept (2, 0) and a y-intercept (0, 3).

Using the point-slope form $y - y_1 = m(x - x_1)$, write an equation for the line

1. with slope -2, containing the point (3, 4) 1. _____
2. containing the points (1, -3) and (-5, 2) 2. _____
3. with slope 0, containing the point (4, 2) 3. _____
4. perpendicular to the line in problem #1, containing the point (3, 4) 4. _____

Solve for x , where x is a real number. Show the work that leads to your solution.

5. $(x + 3)(x - 3) > 0$

6. $x^2 - 2x - 15 \leq 0$

7. $12x^2 = 3x$

8. $\sin 2x = \sin x$, $0 \leq x \leq 2\pi$

9. $|x - 3| < 7$

10. $(x + 1)^2(x - 2) + (x + 1)(x - 2)^2 = 0$

11. $27^{2x} = 9^{x-3}$

12. $\log x + \log(x - 3) = 1$

Solve for x , where x is a real number. Show the work that leads to your solution.

1. $x^2 + 3x - 4 = 14$

2. $\frac{x^4 - 1}{x^3} = 0$

3. $(x - 5)^2 = 9$

4. $2x^2 + 5x = 8$

I. Polynomials

A. Factor Completely.

1) $t^2 - 4t - 21$

2) $x^3 - 8$

3) $27x^3 + 125$

4) $10m^3n^2 - 15m^2n + 25m$

5) $25x^2 - 49$

6) $x^3 - 2x^2 - 4x + 8$

B. Simplify the following expressions.

1) $(-3x^2 + 4x - 7) + (2x^2 - 7x + 8)$

2) $5x^2 \cdot 2x^5$

3) $(-2c^3)^2$

4) $(39a^4 - 4a^3 + 2a^2 - a - 7) - (10a^4 + 3a^3 - 2a^2 - a + 8)$

5) $\frac{283x^{-5}y^{21}}{6x^{-5}y^{25}}$

6) $(3x + 7)(2x + 5)$

7) $-3xy^3(x - 2y)$

8) $(3x^2 + x - 1)(2x - 3)$

9) $(8a^3b^2)(2aV)$

10) $(-3x^2y^3z)^3$

11) $(15a^4b^2c)^0$

12) $\frac{3x^3y^2}{6x^2y^5}$

13) $(x + 6)^2$

14) $t^3 \cdot t^{(n-3)}$

15) $(x^m)^n \cdot (x^n)^{n-m}$

16) $\frac{4^{h-k}}{4^{h+k}}$

C. Solve the following quadratic equations for x.

1) $(2x+1)(x+3) = 0$

2) $x^2 + 6x = 0$

3) $2x^2 + 4x = -3$

4) $x^2 = 16$



II. Linear Operations/Solving Inequalities

A. Create your own grid and graph the following equations.

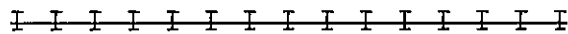
1. $y = -\frac{3}{4}x + 4$

2. $y = (x - 2)^2 + 1$

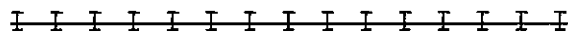
3. $y = |x|$

B. Solve the inequality and graph the solution set on a number line:

1. $4(t + 2) - 3 > 7(t + 5)$



2. $|x - 8| = 3$



C. Answer each of the following concerning linear equations.

1) Determine the slope of the line containing the points (6, -2) and (-1, 5).

2) Determine an equation for a line with slope $\frac{1}{2}$ and y-intercept at (0, -3).

3) Determine an equation for a line parallel to $y = -3x + 4$ containing the point (2, 1).

4) Line m is perpendicular to $y = 4x - 1$ and passes through the origin. What is the equation of line m.

Simplify

1. $\frac{\sqrt{x}}{x}$ _____ 2. $e^{\ln 3}$ _____

3. $e^{(1+\ln x)}$ _____ 4. $\ln 1$ _____

5. $\ln e^7$ _____ 6. $\log_3(1/3)$ _____

7. $\log_{1/2} 8$ _____ 8. $\ln \frac{1}{2}$ _____

9. $e^{3 \ln x}$ _____ 10. $\frac{4xy^{-2}}{12x^{-\frac{1}{3}}y^{-5}}$ _____

11. $27^{2/3}$ _____ 12. $(5a^{2/3})(4a^{3/2})$ _____

13. $(4a^{5/3})^{3/2}$ _____ * 14. $\frac{3(n+1)!}{5n!}$ _____

1. $5 \log_3 x + 7 \log_3 y$

2. $6 \log x - 4 \log y - 2 \log z$

3. $3(\log_3 x - 4 \log_3 y)$

4. $\log \frac{1}{x} + 4 \log x$

5. $20 \log \sqrt[5]{x}$

6. $3 \log_3 x - \log_3 \frac{1}{y}$

7. $\frac{1}{2} (\log x + 3 \log y) - 2 \log z$

8. $3^x = 8$

9. $5^{x+1} = 12$

10. $7^{2x} = 11$

11. $5^x = 3^{x+1}$

12. $2^{x+1} = 4^x$

13. $3^{x-2} = 5^{1-x}$



Solving Quadratic Equations Assignment

1. Solve for x .

a. $x^2 + 7x - 18 = 0$

b. $x^2 + x + \frac{1}{4} = 0$

c. $2x^2 - 72 = 0$

d. $12x^2 - 5x = 2$

e. $20x^2 - 56x + 15 = 0$

f. $81x^2 + 72x + 16 = 0$

g. $x^2 + 10x = 7$

h. $3x - 4x^2 = -5$

i. $7x^2 - 7x + 2 = 0$

j. $x + \frac{1}{x} = \frac{17}{4}$

k. $x^3 - 5x^2 + 5x - 25 = 0$

l. $2x^4 - 15x^3 + 18x^2 = 0$

2. If $y = x^2 + kx - k$, for what values of k will the quadratic have two real solutions?

3. Find the domain of $y = \frac{2x-1}{6x^2-5x-6}$.

5



Special Factorization - Assignment

• Completely factor the following expressions

1. $x^3 - 25x$

2. $30x - 9x^2 - 25$

3. $3x^2 - 5x^2 + 2x$

4. $3x^8 - 3$

5. $16x^4 - 24x^2y + 9y^2$

6. $9a^4 - a^2b^2$

7. $4x^4 + 7x^2 - 36$

8. $250x^3 - 128$

9. $\frac{8x^3}{125} + \frac{64}{y^3}$

10. $x^5 + 17x^3 + 16x$

11. $144 + 32x^2 - x^4$

12. $16x^{4a} - y^{8a}$

13. $x^3 - xy^2 + x^2y - y^3$

14. $x^6 - 9x^3 - 81x^2 + 729$

15. $x^2 - 8xy + 16y^2 - 25$

16. $x^5 + x^3 + x^2 + 1$

17. $x^6 - 1$

18. $x^6 + 1$

Given $f(x) = 7 - x^2$ and $g(x) = x - 4$, find each value.

1. $f(-4)$

2. $g(-4)$

3. $f(g(-2))$

4. $f(4a)$

5. $f(t+1)$

6. $[f \circ g](x)$

7. $[g \circ f](x)$

Given the following functions, $f(x) = -3(x-2)^2 - 1$ and $g(x) = \frac{2x-3}{x+5}$, find:

8. a. $f(g(2))$

b. $g(f(2))$

9. If $g(x) = x^2 - 5x + 12$ then find:

a. $g(-6)$

b. $g(x-2)$

Simplify the following rational expressions.

10. $\frac{x}{4} + \frac{2x}{3}$

11. $\frac{3x^2}{8} \cdot \frac{14}{9x}$

12. $\frac{2}{3} \div \frac{1}{4}$

13. $\frac{x^2 - x - 20}{x + 4} \cdot \frac{x - 3}{x^2 - 2x - 15}$

14. $\frac{2x + 1}{x^2 - 4} + \frac{5}{x - 2}$

15. Solve the equation: $\frac{-2}{x+3} = \frac{1}{x+1}$

7



Linear Functions - Assignment

1. Find the equation of the line in slope-intercept form, with the given slope, passing through the given point

a. $m = -7, (-3, -7)$

b. $m = \frac{-1}{2}, (2, -8)$

c. $m = \frac{2}{3}, \left(-6, \frac{1}{3}\right)$

2. Find the equation of the line in slope-intercept form, passing through the following points.

a. $(-3, 6)$ and $(-1, 2)$

b. $(-7, 1)$ and $(3, -4)$

c. $\left(-2, \frac{2}{3}\right)$ and $\left(\frac{1}{2}, 1\right)$

3. Write equations of the line through the given point a) parallel and b) normal to the given line.

a. $(5, -3), x + y = 4$

b. $(-6, 2), 5x + 2y = 7$

c. $(-3, -4), y = -2$

4. Find an equation of the line containing $(4, -2)$ and parallel to the line containing $(-1, 4)$ and $(2, 3)$. Put your answer in general form.

5. Find k if the lines $3x - 5y = 9$ and $2x + ky = 11$ are a) parallel and b) perpendicular.